

**What is claimed is:**

1. An apparatus for detecting a particulate in a fluid, the apparatus comprising

a platform comprising a substrate having a surface, wherein said surface defines a detection chamber comprising an area that is coated with a specific binding reagent that specifically binds to the particulate to be detected;

✓ a fluid sample input means in fluid communication with the detection chamber that is coated with the specific binding reagent;

✓ a wash buffer reservoir containing a wash buffer in fluid communication with the detection chamber that is coated with the specific binding reagent;

✓ a fluid waste receptacle in fluid communication with the detection chamber that is coated with the specific binding reagent;

✓ wherein an amount of a fluid sample comprising a particulate is moved from the fluid sample input means to the detection chamber and incubated thereon for a time sufficient to result in specific binding between the particulate in the fluid sample and the specific binding reagent in the detection chamber; and

✓ wherein the fluid sample is replaced with the wash buffer and displaced into the fluid waste receptacle; and

✓ wherein the wash buffer is further displaced into the fluid waste receptacle; and

✓ wherein a particulate specifically bound to the detection chamber is specifically bound to the specific binding reagent and is detected thereupon.

2. An apparatus according to claim 1 wherein the surface of the detection chamber is a porous surface.

3. The apparatus of claim 1, wherein the sample input means comprises an area on said first surface, wherein a metered amount of an unmetered fluid sample applied to the surface is

retained in the fluid sample input means, the surface further comprising an overflow reservoir in fluid communication with the fluid sample input means, wherein fluid comprising the unmetered fluid sample in excess of the metered amount of the fluid sample that is retained in the fluid sample input means is retained in the overflow reservoir on the surface of the platform.

4. ✓ An apparatus according to claim 1, wherein the particulate is a cell.

same as 5. ✓ 5. An apparatus according to claim 1 wherein each of the components of the apparatus in fluid communication with one another are connected by a plurality of microchannels that enable fluid communication between the components of the apparatus.

7 ✓ 6. An apparatus according to claim 4, further comprising:  
a label reservoir comprising an amount of a detectable labeling moiety that is specific for the particulate to be detected and is in fluid communication with the detection chamber, wherein the wash buffer is displaced from the detection chamber by the solution comprising the detectable labeling moiety.

8 ✓ 7. An apparatus according to claim 6, wherein the detectable labeling moiety is a histochemical stain.

9 8. An apparatus according to claim 6 wherein the detectable labeling moiety is a immunochemical reagent.

10 9. An apparatus according to claim 8 wherein the immunochemical reagent is a detectably labeled antibody.

11 10. An apparatus according to claim 9 wherein the detectable label is a fluorescent label.

12 11. An apparatus according to claim 9 wherein the detectable label is produced by an enzymatic moiety, wherein the apparatus further comprises a substrate for the enzymatic moiety wherein the substrate is converted to a detectable label by enzymatic action.

13 12. An apparatus according to claim 11 wherein the substrate is a component of the wash buffer.

14. An apparatus according to claim 1 wherein the wash buffer further comprises a detectable label.

15. An apparatus according to claim 11 wherein the substrate comprises a component of the reservoir containing the detectable labeling moiety.

16. An apparatus according to claim 1 wherein a portion of the detection chamber is optically transparent.

17. An apparatus according to claim 3 wherein the metered amount of the fluid sample is from about 10 $\mu$ L to about 500 $\mu$ L.

18. An apparatus according to claim 1 wherein the detection chamber comprises a volume from about 5 $\mu$ L to about 1000 $\mu$ L.

19. An apparatus according to claim 1 wherein the specific binding reagent is an antibody, a ligand, a lectin, an integrin, an antigen, a receptor, a carbohydrate or an adhesion molecule.

20. An apparatus according to claim 1 further comprising a device, wherein the device has a surface or cavity that accommodates the platform, and a light source positioned to illuminate the platform.

21. An apparatus according to claim 20 further comprising a photodetector, wherein the photodetector is positioned to detect light from the light source transmitted through or reflected from the detection chamber on the platform surface.

22. An apparatus according to claim 21 wherein a portion of the detection chamber is optically transparent, and the photodetector and the light source are positioned so that light from the light source illuminates the detection chamber and is detected by the photodetector through the optically transparent portion of the platform.

23. An apparatus according to claim 21 wherein a portion of the detection chamber comprises a reflective surface, and the photodetector and the light source are positioned so that light

from the light source illuminates the detection chamber is reflected therefrom and the reflected light is detected by the photodetector.

X 31 24. An apparatus according to claim 20 wherein the detection chamber further comprises alternating transparent and reflective regions.

X 3 25. An apparatus according to claim 24, wherein the alternating transparent and reflective regions define a pattern in the detection chamber.

37 26. An apparatus according to claim 24 wherein the specific binding reagent is present on the surface of the platform on a transparent region thereof.

37 27. An apparatus according to claim 1 wherein the detection chamber that is coated with a specific binding reagent is further treated with a blocking agent that prevents non-specific binding to the surface of the platform.

28. An apparatus according to claim 27 wherein the specific binding reagent is present in the detection chamber on transparent regions thereof, and the blocking reagent is present in the detection chamber on transparent and reflective regions thereof.

✓ 29. An method for detecting a particulate in a fluid using the apparatus of claim 1, the method comprising the steps of:

applying an amount of a sample to the fluid sample input means of the apparatus;

moving the fluid sample from the fluid sample input means to the detection chamber;

incubating the fluid sample in the detection chamber for a time sufficient to result in specific binding between the particulate in the fluid sample and the specific binding reagent in the detection chamber;

replacing the fluid of the fluid sample in the detection chamber with the wash buffer;

displacing the wash buffer into the fluid waste receptacle; and

detecting the particulate specifically bound to the detection chamber.